REMARKS

Claims 1 – 11 are now pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

DRAWINGS

The drawings stand accepted subject to correction of certain informalities. Applicant submits formal drawings concurrently herewith.

REJECTION UNDER 35 U.S.C. § 112

Claims 1 and 4-6 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point and distinctly claim the subject matter which Applicant regards as the invention. This rejection is respectfully traversed. Notwithstanding, Applicant amends the claims to address the concerns itemized in the office action. In particular, a singular alignment layer remains in the claims. Further, the singular alignment layer can cover either the first or second conductive member.

In view of the foregoing, reconsideration and withdrawal of the rejections are respectfully requested.

REJECTION UNDER 35 U.S.C. § 102

Claim 1 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Tsuda et al. (JP 11-002820). This rejection is respectfully traversed. Notwithstanding,

claim 1 is amended to recite that the conductive material contains conductive particles and non-conductive spacers. The conductive particles have an outside diameter that is 5 to 20% larger than an outside diameter of the non-conductive spacers.

As stated in the specification, if the outside diameter of the conductive particles is smaller than the claimed range, it would be difficult to obtain improved conduction reliability by breaking through the alignment layer with the conductive particles. On the other hand, if the outside diameter of the conductive particles is larger than the claimed range, the cell thickness of the liquid crystal display panel (as set by the non-conductive spacers) would be affected. The claimed range is critical to balancing this compromise.

In contrast, Tsuda teaches spacers 7 which have and outside diameter of 5 to 10 micrometers, and conductive members 6 having an outside diameter of 5 to 10 micrometers. As such, Tsuda teaches conductive members 6 having a diameter equal to that of the spacers 7. Tsuda does not teach conductive members having a diameter which is 5 to 20% larger than a diameter of the spacers as claimed.

Claim 4 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Yamagishi (US 6,466,294). This rejection is respectfully traversed. Notwithstanding, claim 4 is amended to call for the alignment layer to be provided on a surface of at least one of the first conductive member and the second conductive member, except a place where the conductive particles break through the alignment layer and conductively contact the at least one of the first conductive member and the second conductive member.

As stated in the specification, since the conductive particles break through

the alignment layers to attain vertical conduction, the alignment layers may be formed such that they extend to the vertical conducting portion, thus eliminating the restrictions on the position of the outer edges of the alignment layers. In the resulting device, the alignment layer is provided over the entire surface except where the conductive particles break through. In contrast, as shown in Yamagishi, the outer edges of the alignment layers must be positioned between the outer edge position of the display area of the liquid crystal display panel and the inner edge position of the vertical conducting region. The invention is free of such restrictions, so that the alignment layers may be formed all over the vertical conducting portion except in an area where the conductive particles break through the alignment area. Yamagishi does not teach such an arrangement.

Claim 4 also calls for the alignment layer to have a thickness of 100 to 400 angstroms. Yamagishi is completely silent with respect to the thickness of the alignment layers 7. Furthermore, Tsuda teaches an alignment layer having a thickness of 1000 angstroms.

As stated in the specification, to improve the conduction reliability of the vertical conducting portion, it is preferable to form the alignment layers to be slightly thinner than those in the prior art. To be more specific, the thickness of the alignment layers preferably range from 100 to 400 angstroms. If the alignment layers are thinner than the above range, the alignment layers would not be able to fully display their functions. If the above range is exceeded, the conduction reliability in the vertical conducting portion would be considerably reduced. The claimed thickness is critical to provide the desired conduction reliability.

In view of the foregoing, reconsideration and withdrawal of the rejections are respectfully requested.

REJECTION UNDER 35 U.S.C. § 103

Claims 2, 3 and 7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tsuda in view of Yamagishi. This rejection is respectfully traversed.

Claims 2 and 3 depend from claim 1. Applicant respectfully asserts that claims 2 and 3 are allowable for at least the same reasons as set forth above with respect to claim 1. Further, the arguments set forth above regarding claim 4 bear on the subject matter of claim 2 and should be consider as equally applicable thereto.

Claim 7 depends from claim 5. Applicant respectfully asserts that claim 7 is allowable for at least the same reasons as set forth below with respect to claim 5.

Clams 5 and 6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tsuda. This rejection is respectfully traversed.

Claim 5 now recites traditional method steps. As part of the claimed steps, the alignment layer is recited to have a thickness of 100 to 400 angstroms and the conductive particles are recited to have an outside diameter that is 5 to 20% larger than an outside diameter of the non-conductive spacers. The prior art fails to teach these critical dimensions.

As stated in the specification, if the outside diameter of the conductive particles is smaller than the claimed range, it would be difficult to obtain improved conduction reliability by breaking through the alignment layer with the conductive particles. On the other hand, if the outside diameter of the conductive particles is larger

than the claimed range, the cell thickness of the liquid crystal display panel (as set by the non-conductive spacers) would be affected. If the alignment layers are thinner than the above range, the alignment layers would not be able to fully display their functions. If the above range is exceeded, the conduction reliability in the vertical conducting portion would be considerably reduced.

Claim 6 depends from claim 5. Applicant respectfully asserts that claim 6 is allowable for at least the same reasons as set forth below with respect to claim 5.

In view of the foregoing, reconsideration and withdrawal of the rejections are respectfully requested.

NEW CLAIMS

New claims 8-11 are presented herein. Support for these new claims can be found throughout the specification, drawings, and claims as originally filed. Favorable consideration of these new claims is respectfully requested.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the

Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: Feb. 28, 2003

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ATTACHMENT FOR CLAIM AMENDMENTS

The following is a marked up version of each amended claim in which underlines indicates insertions and brackets indicate deletions.

1. (Amended) A liquid crystal device [having] comprising:

a first substrate; [and]

a second substrate [which have electrodes and alignment layers formed on surfaces thereof and are] attached to [each other with] the first substrate;

a liquid crystal sealed [in therebetween] between the first substrate and the second substrate;[, comprising:]

a first conductive member formed on a surface of a peripheral portion of the first substrate;

a second conductive member formed on a portion on the second substrate that opposes the first conductive member; [and]

an alignment layer covering an inner surface of at least one of the first conductive member and the second conductive member; and

[a vertical conducting portion having] a conductive material containing conductive particles and non-conductive spacers [for conductive connection between] conductively connecting the first conductive member and the second conductive member, [wherein the alignment layer is formed such that it extends to cover the surface of at least one of the first conductive member and the second conductive member, and] the conductive particles [extend] breaking through the alignment layer to

be in conductive contact with the at least one of the first conductive member and the second conductive member;

wherein the conductive particles have an outside diameter that is 5 to 20% larger than an outside diameter of the non-conductive spacers.

2. (Amended) The liquid crystal device according to Claim 1, wherein the alignment layer [that covers at least one of the first conductive member and the second conductive member] is formed on an entire surface of an area of a substrate surface where the first substrate and the second substrate oppose each other, except a place where the conductive particles [are disposed] break through the alignment layer.

3. (Amended) The liquid crystal device according to Claim 1, wherein the conductive material is a sealing material for sealing [a] the liquid crystal [in] between the first substrate and the second substrate.

4. (Amended) A liquid crystal device comprising: [having]

a first substrate; [and]

a second substrate [which have electrodes and alignment layers formed on surfaces thereof and are] attached to the first substrate; [each other with]

a liquid crystal sealed [in therebetween] between the first substrate and the second substrate;[, comprising:]

a first electrode formed on a surface of the first substrate;

a second electrode formed on a surface of the second substrate;

a first conductive member [that is] formed on a surface of a peripheral portion of the first substrate and electrically connected with the first electrode;

a second conductive member [that is] formed on a portion on the second substrate opposing the first conductive member and electrically connected with the second electrode; and

a vertical conducting portion having a conductive material containing conductive particles [for electrically conductive connection] conductively connected between the first conductive member and the second conductive member; and [, wherein the]

an alignment layer [is] provided on a surface of at least one of the first conductive member and the second conductive member, except a place where the conductive particles break through the alignment layer [are provided,] and [the conductive particles are in electrically conductive] conductively contact [with] the at least one of the first conductive member and the second conductive member;

wherein the alignment layer has a thickness of 100 to 400 angstroms.

5. (Amended) A manufacturing method for a liquid crystal device [having] comprising:

attaching a first substrate and a second substrate [which have electrodes and alignment layers formed on surfaces thereof and are attached] to each other with a liquid crystal sealed in therebetween;[, and comprising]

forming a first conductive member [formed] on a surface of a peripheral portion of the first substrate;[,]

forming a second conductive member [formed] on a portion [on] of the second substrate that opposes the first conductive member;[, and]

forming an alignment layer to cover a surface of at least one of the first conductive member and the second conductive member; and

using compression bonding to conductively connect the first conductive member and the second conductive member in a vertical conducting portion [having] with a conductive material containing conductive particles and non-conductive spacers, said [for electrically conductive connection between the first conductive member and the second conductive member, whereby the alignment layer is extendedly formed to cover the surface of at least one of the first conductive member and the second conductive member, and the first substrate and the second substrate are attached to each other via the conductive material and] compression-[bonded thereby to cause] bonding causing the conductive particles to break through the alignment layer to [be in electrically conductive] conductively contact [with] the at least one of the first conductive member and the second conductive member;

wherein the alignment layer has a thickness of 100 to 400 angstroms and the conductive particles have an outside diameter that is 5 to 20% larger than an outside diameter of the non-conductive spacers.

6. (Amended) The manufacturing method for a liquid crystal device according to Claim 5, wherein[, in a] said step for [extendedly] forming the alignment layer [to cover at least one of the first conductive member and the second conductive

member,] further comprises forming the alignment layer [is formed] on an entire area of the surface where the first substrate and the second substrate oppose each other.

7. (Amended) The manufacturing method for a liquid crystal device according to Claim 5, wherein the conductive material is used as a sealing material for sealing [a] the liquid crystal between the first substrate and the second substrate.